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The Roots of C. D. Broad's Growing Block Theory of Time

EMILY THOMAS

Durham University

emily.e.thomas@durham.ac.uk

1. Introduction

The growing block theory of time holds that the past and present are real, and the future is unreal. The passage of time comprises new things coming into existence: as the present moves forward, and what was once present becomes past, the 'block' of reality grows.

The growing block view is a relatively new theory of time, dating to the 1920s.¹ In the early twentieth century it was poorly received but, following its 1997 revival by Michael Tooley, it is enjoying something of a resurgence.² Given this, it is perhaps surprising that there is only a little scholarship on its origins.³ This paper addresses that neglect, placing the growing block theory in its historical context and exploring its development. It advances two theses. The first concerns the historical appearance of the growing block view. The theory is often said to be 'pioneered' by the British emergentist C. D. Broad.⁴ However, I show that fellow emergentist Samuel Alexander clearly articulated the theory before Broad, and leaned towards it. The second thesis concerns Broad's reasons for defending the growing block theory. I argue that Broad's newfound conviction in 1920 that time has a direction, coupled with Broad's relationism about time, led him towards it. By way of connecting these theses, I make the case that Broad's views on the direction of time (and perhaps even the growing block theory itself) are borrowed from Alexander.

This paper proceeds as follows. §2 provides some background on debates about time in early twentieth century British philosophy. §3 shows that Alexander discussed the growing

¹ Scholars occasionally suggest the theory appeared much earlier. For example, Putnam (1967, p. 244) connects Aristotle's indeterminism about future truths with the view that the past is real but the future is not. Craig (1987, p. 102) characterises Duns Scotus' universe as one 'which expands with time', on which the future 'in no sense actually exists'. Although intriguing, we should be wary. As Coope (2005, pp. 3-4) writes, the apparent familiarity philosophers of time encounter when reading Aristotle is 'largely deceptive'.

² Recent defenders include Forrest (2004), Button (2006), and Briggs & Forbes (2016).

³ On Broad's growing theory view, see Mundle (1959, pp. 357-64), Tooley (1997, pp. 226-8), Earman (2008, pp. 137-8) and Gustavsson (2014, §3); Oaklander (2006, pp. 3-27) discusses Broad's theory with regard to propositions. Thomas (2015) argues that Hilda Oakeley was another early growing block theorist.

⁴ For example, see Earman (2008, p.136).

block theory, and that his account of deity inclines towards it. §4 explores Broad's evolving metaphysics of time. It primarily focuses on Broad's early shift towards the growing block view, enquiring after his philosophical motivations and sources. More briefly, it also argues that, although Broad later shifted away from the growing block view, his preoccupation with the direction of time remained. §5 considers the reception of Broad's theory.

2. Early twentieth century idealist-realist debates over time

At the turn of the twentieth century, British philosophy saw conflict between idealists and realists, and time was a key issue. Almost all idealists held that time is unreal, in the sense that nothing (or, at least, nothing at the fundamental level of reality) is in time. To give a few examples, F. H. Bradley (1893, p. 205) argues that time is 'unreal as such', an appearance of the Absolute. Bernard Bosanquet (1897) argues that the ultimate reality is timeless. McTaggart's (1908) "The Unreality of Time" famously argues that time cannot exist, and we are misperceiving a deeper order. Andrew Seth Pringle-Pattison (1917, p. 343) argues that time depends on the succession of content experienced within minds; as such, time depends on human minds, and is not an independent feature of the world. H. Wildon Carr (1924, p. 603) agrees that time is mind-dependent and, on his system, time is grounded in interactions between 'monads', individual minds.

Slowly, 'new realists' emerged, including Bertrand Russell, G. E. Moore, Alexander, and Broad. These realists came to uphold the reality of time, in the basic sense that things really are in time. However, this base thesis leaves room for many further questions, including the following.

Does the present really move? Realists about temporal passage hold that the present really moves, such that events really become present and then past; anti-realists about temporal passage deny this. What is the ontology of time? 'Substantivalism' holds that time is a real entity, to be listed on the contents of the universe; this view is traditionally opposed to 'relationism', which holds that time is merely temporal relations holding between bodies. Do the past or future exist? Against the growing block theory, 'eternalism' holds that the past, present and future exist; and 'presentism' holds that only the present exists. As we will see, although the new realists agreed on the basic reality of time, they disagreed over many of these further questions.

3. Alexander and the growing block theory

Alexander's 1920 *Space, Time, and Deity* was based on his 1916-1918 Gifford lectures. This section argues that, whilst Alexander is an eternalist, he describes the growing block theory and leans towards it.

Whilst detailing his understanding of space and time, Alexander writes that we can call spacetime 'Motion':

Space-Time thus consists of what may be called lines of advance connected into a whole... In a line of advance $c\ b\ a$ we have the displacement of the present from c through b to a , so that a becomes present while b becomes past and c still further past... In terms of earlier and later, b having being later and c earlier, a becomes later and cb earlier... What we ordinary call motion of a body is the occupation by that body of points which successively become present... Thus Space-Time is a system of motions... a single vast entity Motion. (Alexander, 1920i, pp. 61-2)

For Alexander, a body occupies points in spacetime. A 'motion' is a 'line of advance': the process whereby the points occupied by a body successively become present. This discussion may give the impression that Alexander is a realist about temporal passage, but he is not.

A little earlier, Alexander (1920i, p. 44) stated that 'Physical Time' is a succession from earlier to later. However, Alexander adds that we can conveniently speak of past, present, and future in physical time, the present being a moment of physical time 'fixed by relation to an observing mind'. The passage above must be read in light of this: spacetime consists of lines of advance, such that point a becomes present and then past, but the present is fixed by relation to a mind. In physical time there is no presentness, points are merely earlier or later than one another. Thus, Alexander is an anti-realist about temporal passage. This anti-realism can also be found in Russell (1915, p. 212), who argued that the distinctions of past, present, and future are a kind of 'mental time', found only in our experience.

Following his characterisation of spacetime as Motion, Alexander worries that it may be 'misinterpreted':

We may think of fresh Space as being swept out in Time. We figure advance in Time, the growth of the world, as an advance in column, and it is then easy to go on and treat the

present moment as determining a section along this advance, so that Space becomes the arrested events of the present or any one moment. We then have the idea of an infinite spatial present sweeping forward in time. (Alexander, 1920i, p. 62)

On the picture Alexander describes here, fresh space is ‘swept out’ in time, like the unrolling of a rug: there is a moving present, and at each present moment, space - and, with space, the world - grows in time. Later, Alexander (1920ii, p. 366) describes this picture again, as one on which the matrix spacetime ‘grows bigger in extent with the lapse of Time’. Alexander is describing a growing block theory: space, the ‘block’ of reality, grows in time.

Alexander (1920i, p. 62) goes on to explain why his metaphysic is eternalist, rather than a growing block theory. One reason is that space and time are infinite, in the sense of being self-contained or complete. If space were growing in time it would not be self-contained, or complete as it is.⁵ Another reason is that if the present really changed from moment to moment, time would lack the continuity required to unify those moments in a continuous succession. The reasoning underlying this view is intricate.⁶

Alexander (1920i, p. 63) likens his eternalist universe to closed vessel containing gas, in which the gas molecules dash about ‘in all manner of lines of advance’. We can pick any gas molecule to act as the ‘centre of reference’, to be fixed as the present moment. Its fellow molecules stand at various degrees of remoteness from this molecule, representing how near or far they may be in time, but all are equally real. In an unpublished manuscript “The Reality of the Past”, composed around the same time as *Space, Time, and Deity*⁷, Alexander repeats his rejection of the growing block view in favour of eternalism: ‘I desire to get rid of this

⁵ Commentators have long recognised similarities between Bradley’s Absolute and Alexander’s spacetime; see Brettschneider (1964, p. xi) and Thomas (2013, p. 552). Alexander’s conception of spacetime as *complete* provides a fresh case in point. Calkins (1925, p. 436) describes a view she labels ‘metaphysical absolutism’, on which the universe comprises an ‘individual, and all-including being... [an] Absolute One’. Calkins (1925, p. 440) explains that because nothing can exist outside it, ‘nothing can be future to it, or irrevocably past’. Both Bradley’s Absolute and Alexander’s spacetime fit this description.

⁶ And fortunately irrelevant to this paper, although I provide some elaboration for the interested reader. Alexander holds that time must be unified with space, or else time would lack the continuity needed to provide a succession from instant to instant; see my (2013, pp. 554-8). Alexander (1920i, p. 62) claims, ‘A present which occupies the whole of Space would suffer from the same defect as a mere instant disconnected with other instants... [the present] would be all that there was of Time, a ‘now’ perpetually re-created’. Alexander’s worry is that if one instant were really, physical present, that instant would be disconnected from its fellows, leading to a disconnected series of ‘nows’. For Alexander, the continuity of time proves the lack of a mind-independent present.

⁷ The manuscript is undated but it refers to the gas illustration from ‘last year’. This allows us to date the manuscript between 1917 and 1921, following Alexander’s 1916-1918 Gifford Lectures or their 1920 publication.

notion of a world which grows by jerks from moment to moment, and to make clear that the past and the future are real'.⁸

The final part of this section shows that Alexander's account of God inclines towards the growing block theory.⁹

Alexander holds that spacetime sits at the bottom of a hierarchy of emergence. When motions in spacetime become complex enough, new qualities emerge in it, such that matter emerges from spacetime, life emerges from matter, and so on. Alexander argues that the final quality that will emerge is deity:

[The universe] exhibits materiality and life and mind. It compels us to forecast the next empirical quality of deity. On the one hand, we have the totality of the world, which in the end is spatio-temporal; on the other the quality of deity engendered or rather being engendered, within that whole (Alexander 1920ii, p. 353).

The universe compels us to 'forecast' deity: deity is not yet exhibited but it will emerge *in the future*. Strictly speaking, this means we must forecast deity in the future relative to our present, our chosen point of reference; for beings who choose a later point of reference, our 'future' quality of deity will be present to them. This 'future' quality of deity exists *simpliciter* but it does not exist at this moment in time.

However, Alexander frequently speaks as though deity does not exist *simpliciter*. In the passage above, we are told that there is the 'totality of the world' in which deity is 'being engendered'; this is in tension with the idea that deity has already been engendered in the totality of the world. Directly prior to this passage, Alexander (1920ii, p. 353) writes that God is the whole world as possessing the quality of deity but this whole world is 'ideal' rather than actual: 'As an actual existent, God is the infinite world with its nusus towards deity, or, to adapt a phrase of Leibniz, as big or in travail with deity'. Again, this suggests that the infinite world is pregnant with deity but has not yet given birth to deity *simpliciter*, rather than merely at this moment in time. The same suggestion can be found in a later text:

⁸ John Rylands Library, Manchester [hereafter 'JRL']: ALEX/A/2/2/42.

⁹ On Alexander's account of deity more generally, see Titus (1933) and Thomas (2016).

[God] is himself in the making, and his divine quality or deity a stage in time beyond the human quality. And as the root and leaves and sap of the plant feed its flower, so the whole world, as so far unrolled in the process of time, flowers into deity... God's deity is thus the new quality of the universe which emerges in its forward movement in time. (Alexander, 1927, p. 330)

Again, the notion that the whole world 'so far unrolled in the process of time' does not yet exhibit deity suggests that there is yet more world to unroll *simpliciter*.

I argue that Alexander leans towards conceiving deity as unreal *simpliciter*, entailing that the future is unreal *simpliciter*. One of Alexander's peers made the same observation:

Now in some sense the distinction between past and future in Professor Alexander's metaphysic is a relative distinction... Reality has a *nisus* towards Deity, a quality which has not yet emerged. But is it possible, consistently with the general position, to maintain that God is yet to come? (Macmurray, 1928, pp. 156-7)

Macmurray's worry is that Alexander's position that God is *yet to come* is inconsistent with the fact that God timelessly *is*. Speculatively, I wonder if Alexander was conscious of this leaning towards an unreal future when he formulated the position that has become known as the growing block theory: a growing, spatially infinite world, swept forwards in time *towards* deity.

4. Broad and the growing block theory

Across his career, Broad defended no less than three theories of time. Broad's 1921 encyclopaedia article, "Time", defends Russell-style eternalism. Broad's 1923 *Scientific Thought* defends the growing block. Broad's 1938 *Examination of McTaggart's Philosophy, Volume II* defends a new theory altogether. In a 1959 piece, "A Reply to My Critics", Broad reflects on the evolution of his metaphysics. This section focuses on Broad's early change of mind - between "Time" and *Scientific Thought* - but it says a little on Broad's later change of mind too.

4.1 Broad's new direction and the direction of time

In the 1920s, Broad's views shifted as follows. "Time" argued that a real distinction between past, present and future would involve 'confusions':

The distinction between past, present, and future is not one which, like that between before and after, lies wholly in the experienced objects, but is one that rests on the relations between experienced objects and the states of mind in which they are experienced... [T]he distinction between present and not-present may be usefully compared with that between here and elsewhere in space. Here means near my body; elsewhere means distinct from my body.
(Broad, 1921a, p. 335)

Objects in the world really do bear before and after relations to each other. However, they are not really past, present or future with regard to each other; they are only past, present or future with regard to our states of mind. A location in time, the 'present', is no more ontologically privileged than a location in space, 'here'. At this point, Broad is an anti-realist about temporal passage.

"Time" goes on to argue for eternalism. Broad (1921a, p. 336) writes that things that have ceased to be present still stand in relations, such that the battle of Hastings will 'continue' to precede the battle of Waterloo. A thing that has ceased to be present does not exist *now*, but it does exist *simpliciter*. A little later, Broad (1921a, p. 339) adds, 'past, present, and future are all always equally real'. This account of time is strongly reminiscent of Russell's 1915 account, and Broad (1959, p. 765) later confirmed that when writing "Time" he was 'almost completely' under Russell's influence.

By *Scientific Thought*, Broad has changed his mind on various issues. In a chapter titled "The General Problem of Time and Change", Broad attempts to understand the concepts of time and change. He opens his discussion of time by drawing analogies between temporal events and spatially extended objects. Broad (1923, pp. 54-5) considers all things that exist for any length of time to be events, from lightning flashes to the cliffs of Dover. The temporal relations that hold between events are 'similar' to those that hold between extended objects. For example, we can talk of two events (such as a rainstorm and a lightning flash)

and two objects (such as two sticks) overlapping. We can also compare the relations of left to right that hold between objects, with the relations of earlier to later that hold between events.

However, unlike in “Time”, Broad argues that ultimately analogies between space and time are *not* useful:

So far, the analogy between Time and Space has seemed to work very well... But, if we reflect a little more carefully, we shall see that the analogy between before and after and right and left is not so illuminating as it seems at first sight. The peculiarity of a series of events in Time is that it has not only an intrinsic *order* but also an intrinsic *sense*. (Broad, 1923, p. 57)

To illuminate this, Broad (1923, p. 57) considers three points on a line, $A B C$. These points are ordered, such that B sits between A and C , and C does not sit between A and B , but they do not possess an intrinsic sense or direction: we can move $A B C$ or $C B A$. In contrast, Broad is arguing that a time series possesses an intrinsic order *and* direction. Events in time are ordered: Margaret Thatcher’s term as Prime Minister took place between the terms of Winston Churchill and Tony Blair. Further, this series appears to possess an intrinsic sense: one can only move *from* the tenure of Churchill to Thatcher to Blair, not vice versa.

Having set out his view that the time series possesses an intrinsic sense, Broad (1923, pp. 58-9) states, ‘Now the intrinsic sense of a series of events in Time is essentially bound up with the distinction between past, present, and future’. Broad attempts to ‘throw light’ on the past, present, and future by drawing spatial analogies with these temporal characteristics, such as comparing ‘Here’ with ‘Now’. He quickly finds that these analogies are ‘not ultimately useful’, and moves on to treat past, present, and future ‘on their own account’.

Broad (1923, pp. 59-61) opens this part of his discussion by considering two possible accounts of the past, present, and future: the ‘moving spotlight’ theory, an eternalist theory incorporating real temporal passage; and Russell-style eternalism. Broad takes both theories to deny the intrinsic direction of time. He finds both unsatisfactory, and specifically objects that the moving spotlight theory can’t make sense of the direction of time. Broad is searching for a theory of the past, present, and future that can account for the direction of time.

Broad (1923, pp. 65-6) moves on to discuss ways of understanding change. He argues that one way things change is when they come into new relations with something that did not exist before. For example, an only child changes into a ‘sister’ when a younger sibling is

born, and a new relation comes into being between sister and brother. Broad uses this discussion as a jumping off point to introduce the growing block theory of time:

When an event, which was present, becomes past, it does not change or lose any of the relations which it has before; it simply acquires in addition new relations which it *could* not have before, because the terms to which it now has these relations were simply non-entities. It will be observed that such a theory as this accepts the reality of the present and the past, but holds that the future is simply nothing at all. Nothing has happened to the present by becoming past except that fresh slices of existence have been added to the total history of the world... The sum total of existence is always increasing, and it is this which gives the time-series a sense as well as an order. (Broad, 1923, pp. 66-7)

This theory explains the sense or direction of events in a time series because a time series comes into existence slice-by-slice. We can move across the points of a line in two directions - $A B C$ or $C B A$ - because all the points exist. In contrast, when Churchill's term as Prime Minister was present, the terms of Thatcher and Blair did not exist. This is why we can only move in one direction through the events of a time series.

Why did Broad shift towards the growing block view?¹⁰ *Scientific Thought* expresses a newfound conviction that time has a direction (this conviction is 'newfound' because it is wholly absent from "Time"). Clearly, Broad wanted to find a theory of time that would account for its directionality: Broad describes this feature of time as a 'peculiarity', connects it with the nature of the past, present, and future, and then searches for a theory of time that can illuminate these issues. I argue that, once Broad became convinced that time has a direction and this needs explaining, the growing block view provided a natural solution. To explain why, I turn to Broad's relationism.

Scientific Thought ranges over a number of debates pertaining to space and time, including the debate between 'absolutism' (i.e. substantivalism) and relationism. Broad (1923, p. 89) rightly explains that absolutists and relationists would agree that the Battle of Hastings precedes the Battle of Waterloo, such that a certain temporal relation exists between them. However, they disagree on this: 'Is this relation simple, direct, and unanalysable,

¹⁰ Mundle (1959, 357-64) is the only piece of literature contrasting Broad's growing block theory with his earlier eternalism. Valuable though his work is, Mundle does not ask this question.

connecting the two events in question and nothing else, or is it a complex compounded out of other relations which involve other terms in addition to the two events?'. Broad writes that relationists hold the former view; in contrast, absolutists hold that the latter view, arguing that there is 'something called Time' which is composed of moments, and relations hold between events and moments. He goes on to defend relationism against various objections, and Broad (1923, p. 113) concludes that absolute space and time are not 'substantial constituents of nature'.

I argue that Broad's relationism, combined with his new conviction concerning the direction of time, led him towards the growing block view. The argument runs as follows. Let us grant that a series of events in time - such as the tenures of Churchill, Thatcher and Blair - appears to have an irreversible direction, from earlier to later. How can we explain this?

Explanations fall into two classes. On the first class, it is held that, however things might appear, time intrinsically lacks direction. For example, it might be argued that the apparent direction of time is merely a mind-dependent feature of human psychology; or that events intrinsically possess directionality, and this provides the time series with direction derivatively.

On the second class, it is held that time has intrinsic direction. Broad is providing us with an explanation of this kind. Whilst a substantivalist who holds that time has an intrinsic direction would explain it via some feature of the entity 'Time', a relationist must seek another explanation. It might be suggested that there is some intrinsic directionality in the temporal relations before and after but this route is certainly not taken by Broad. Temporal relations are asymmetric but, as we saw above, asymmetry does not appear to involve inherent directionality. The relation 'darker than' is asymmetric but one can still move from darker to lighter points on a line, and vice versa. Another strategy for the relationist would be to claim that there is an extra ingredient in time, *in addition* to temporal relations, that provides direction. And this is exactly what Broad does.

In the context of defending relationism, Broad adds:

Undoubtedly, there is something more than mere relations in Time. We have already seen that the Time series has a definite intrinsic sense, and that this arises because there is a continual addition to the sum total of existence, whilst nothing that has ever existed ceases to do so save

in a derivative and analysable sense... But, so long as this absolute feature in Time is recognised, there seems to be no objection to the Relative Theory as such. (Broad, 1923, p. 91)

By the 'Relative Theory', Broad means relationism (he moves between the two labels because relationists hold an exclusively relative account of motion). For Broad, there is 'something more' than mere relations in time, an 'absolute feature' - the way that fresh slices of existence are continually added - that provides direction.

This section has argued that once Broad became convinced that time has an intrinsic direction, his understanding of relationism forced him towards the growing block view as a way of accounting for it. Before moving on, there is one last issue to consider. Why doesn't Broad consider presentism as a way of accounting for the direction of time?

One possibility is that presentism wasn't a live position in early twentieth century British philosophy. As far as I am aware, the only discussion of presentism during this period emerged a few years later, in Collingwood (1925-1926), and none of Collingwood's contemporaries picked it up. Another is that presentism may not fit with Broad's relationism. Depending on how you understand presentism and relationism, it might be worried that temporal relations can't exist, as relations must hold between present *and* past relata, and past relata don't exist.¹¹ Finally, an unreal past might be incompatible with Broad's commitment to the 'specious present'. Explaining why requires some background.

Our temporal awareness presents a 'conundrum'.¹² Our perception appears confined to the present moment, yet we seem to perceive changes that take place over moments of time, such as *seeing* a flame flicker, or *hearing* a trumpet note rise and fall. If we are only aware of the present moment, how can we also be aware of change over several moments? William James (1890, pp. 608-10) popularised a distinction between the 'strict' present, a mathematical, durationless moment; and the 'specious present', the short durations we perceive, comprising several moments that we feel 'as a whole'. James believed we really experience changes (such as a flame flickering) so he was a realist about our experience of temporally extended phenomena. How do such realists explain this phenomenology? Two

¹¹ For discussion, see Lowe (2002, pp. 155-6).

¹² Dainton (2016) provides a comprehensive overview of this problem and the range of responses to it, and I borrow his terminology.

strategies are available. On the ‘retentional model’, our experience of change occurs within discrete episodes of consciousness which lack temporal extension, yet the contents of these episodes are complex enough to represent (or ‘retain’) temporally extended phenomena. In contrast, on the ‘extensional model’, our episodes of consciousness are temporally extended, literally comprising several moments. As presentists *usually* conceive the present to be momentary¹³, the extensional model is incompatible with presentism.¹⁴ The extensional model seems to require the existence of the present and the past. In *Scientific Thought*, Broad (1923, pp. 351-3) uncontroversially defends realism about our experience of temporally extended phenomena. However, scholars disagree over whether this account is extensional or retentional.¹⁵ If Broad holds an extensional model in *Scientific Thought*, this may explain why he does not consider presentism as an account of the past, present, and future: presentism is incompatible with his understanding of the specious present.¹⁶

4.2 Alexander’s 1920 impact on Broad

Why did Broad become convinced that time has an intrinsic direction? One *prima facie* plausible answer is that Broad is persuaded by a discussion found in McTaggart’s 1908 paper.¹⁷ McTaggart sought to show that the time series - which he takes to involve a real, moving present - is an appearance, well-founded in an underlying, atemporal reality. In this context, McTaggart (1908, pp. 462-3) discusses a peculiarity about this time series: it has a ‘particular direction’ as well as an order, such that ‘change is in one direction and not in the other’.

¹³ See Orilia (2014).

¹⁴ See Dainton (2013, p. 400).

¹⁵ See Mabbott (1951), Mundle (1954; 1959, pp. 371-2), Dainton (2000, pp. 136-144; 2013, p. 406, fn7; 2016, §2.7) and Gallagher (2003).

¹⁶ A referee wondered if Broad’s advocacy of the specious present in *Scientific Thought* played a role in Broad’s shift from eternalism to the growing block theory. Although (as explained above) this advocacy may have played a role in explaining why Broad does not consider presentism, I don’t believe it would have motivated Broad’s shift away from eternalism, for the following reasons. First, even *if* Broad held an extensional model of temporal consciousness in *Scientific Thought*, this would be compatible with the growing block theory or eternalism; see Dainton (2013, p. 400). Consequently, this would not have prompted Broad’s shift away from eternalism. Second, Broad’s discussion of temporal consciousness appears much later in *Scientific Thought* than his discussion of time, and there he occasionally argues *from* the growing block theory. For example, Broad (1923, p. 358) rejects the possibility we could sense later events *because* of the unreal future. This implies that Broad’s growing block theory is intellectually prior to his views on temporal consciousness.

¹⁷ McTaggart discussed time further in his later work, especially in the second, 1927 volume of his *Nature of Existence*. However, this work did not come out until after *Scientific Thought* (McTaggart died in 1925, at which point the manuscript was given to Broad to be published under his editorial care).

There is no doubt that Broad was familiar with McTaggart's work. McTaggart taught Broad at Cambridge, and they later became friends and colleagues.¹⁸ We know that Broad was concerned with McTaggart's article when he composed *Scientific Thought* because Broad (1923, p. 4) states in the preface that his discussion of time and change attempts to answer 'some very disturbing arguments' from McTaggart. Having defended the growing block theory, Broad (1923, p. 79) makes good on this promise by arguing that, whilst McTaggart's argument for the unreality of time is the 'best' of its kind, it does not threaten Broad's account. However, there are reasons to doubt that McTaggart's article motivated Broad's intense concern with the direction of time. One reason is that *Scientific Thought* discusses McTaggart *after* discussing the problem of direction and the growing block theory. Another is that Broad was familiar with McTaggart's article before Broad composed "Time", as Broad (1921a, p. 339) discusses the article there. Despite this, "Time" evinces no concern for the direction of time.

Without disregarding McTaggart's influence over Broad, I argue that Broad's sudden, specific concern with the direction of time is grounded not in McTaggart but in Alexander. Broad's 1920s intellectual interactions with Alexander have been overlooked; to illustrate, Gustavsson's (2014) encyclopaedia entry on Broad makes no mention of Alexander, or of Broad's critiques of Alexander. Nonetheless, I argue these interactions played an important role in Broad's work. To understand why, I set Broad's pertinent writings on a timeline.

"Time" was published in 1921 but it was composed prior to mid June 1920. We can be this precise because we know that Alexander's *Space, Time, and Deity* was published in June 1920¹⁹ but, in "Time", Broad (1921a, p. 343) writes that Alexander's lectures 'have not yet appeared in print'. Broad adds that it is impossible to give a fair account of Alexander's views from the short synopses which are alone available. Thus, when Broad composed "Time", *Space, Time, and Deity* had not yet appeared in print, and Broad had not read anything of it except brief précis.

Scientific Thought was published in 1923 but the preface says it was based on a series of lectures delivered during the academic year 1920-1921; these lectures would have begun in October 1920. What happened to Broad between the composition of "Time" prior to mid

¹⁸ Gustavsson (2014) provides a brief biography of Broad.

¹⁹ On 18 June 1920, James Ward wrote to Alexander to say he has received *Space, Time, and Deity*; as this is the earliest that anyone seems to have received the book, we can infer that this is close to its publication date. JRL: ALEX/A/1/1/300/5. Thanks to Anthony Fisher for pointing me to this.

June 1920, and the *Scientific Thought* lectures that began in October 1920? Broad read *Space, Time, and Deity*.

On 3 August 1920, Broad wrote to Alexander to ask for help in understanding *Space, Time, and Deity*: ‘In reading your book I have been completely puzzled by the arguments in Vol I. p. 52-56, in which you attempt to correlate the characteristics of temporal order with the number of dimensions of space’.²⁰ In these pages, Alexander attempts to explain various characteristics of time, including ‘succession’ and the fact it is ‘irreversible in direction’. Alexander (1920i, p. 51) explains that the former is clearly different from the latter, as there is nothing in the relation of successiveness as such that makes it irreversible. On a mere succession, one can move equally from *A* to *C* as from *C* to *A*; the time series is unusual because its movement is irreversible, such that we can only move from *A* to *C*. As should be clear, what Alexander labels the irreversibility of time is the same feature that Broad labels the sense or direction of time. Alexander (1920i, pp. 52-3) goes on to explain the irreversibility of temporal direction via features of the substantial entity, spacetime. The details of Alexander’s explanation are unimportant to us; what is important is that the problem Alexander presents - how best to account for the direction of time - deeply concerned Broad.

From 3-11 August 1920 there was an urgent flurry of correspondence between Broad and Alexander on this problem. The men produced six letters in total, each several pages long. On both sides, the correspondence is critical but amiable.²¹ In 1921, Broad published a substantial, two-part critique of *Space, Time, and Deity*. Broad (1921b, p. 25) opens it by writing that few of the Gifford lectures have been so eagerly awaited as Alexander’s, as they knew he had something ‘extremely ingenious and original’ up his sleeve, and for the most part his readers will not be disappointed. Broad (1921b, p. 37) returns to Alexander’s account of the irreversibility of time - on which if ‘ t_1 and t_2 be two instants and t_1 precedes t_2 , then t_2 cannot precede t_1 ’ - and rejects it at length.

I argue that, whilst Broad clearly did not accept Alexander’s solution to explaining the intrinsic direction of time, he nonetheless took on Alexander’s concern with the problem

²⁰ JRL: ALEX/A/1/1/37/1.

²¹ Alexander concludes his final letter on this topic by writing that Broad is a pleasure to discuss with, because ‘your wits are so quick and sharp as a sword’ whereas mine are ‘slow and blunt as a butter-knife’. JRL: ALEX/A/1/1/37/6.

itself. And it was this newfound belief, that the direction of time poses a problem, that led Broad to defend the growing block theory as a solution.

In constructing his growing block theory, what sources might Broad have drawn on? One possible source is idealist metaphysics. Although most British idealists rejected the ultimate reality of time, many allowed for time in some sense, and occasionally they did so in ways that come close to growing block theories. For example, Edward Caird argued that although the Absolute does not change, change takes place within it. He compares the Absolute with the development of a living organism:

Look at it in one way, and we might say that a developing being *never changes*. He is the same from the beginning to the end of the process of his life; for all his changes are conceived as the manifestation of his identity... Look at it in another way, and we might say that his existence is *all change*, and even that his changes are so complete that there is nothing in him which remains unaltered. (Caird, 1894, p. 171)

Development both involves, and does not involve, change:

Development is a process in which identity manifests itself *just in* change, and returns upon itself *just by means of* change. (Caird, 1894, p. 172)

Although Caird's Absolute is unchanging, it is also continually unfolding. There is kinship here with Alexander's spacetime system. Mander's (2011) study of British idealism discusses Caird along with other idealists sympathetic to ideas surrounding development and evolution, including William Wallace and D. G. Ritchie.

Although it seems likely that Broad would have picked up on these idealist tendencies, there is no evidence directly supporting this. In contrast, there is evidence supporting two further possible sources. Looking back specifically to his views on time, Broad wrote:

By the time I wrote *Scientific Thought* I was greatly influenced by books recently published by Alexander and by Whitehead. The talk in *Scientific Thought* about "the sum-total of existence continually increasing by Becoming,"... goes back to this source. (Broad, 1959, p. 765)

Let's discuss the influence of Whitehead first. Broad is referring to Whitehead's 1919 *Enquiry Concerning The Principles Of Natural Knowledge*. This book discusses the nature of time at length and, although it does not explicitly articulate or defend a growing block theory, Whitehead does make remarks which *arguably* hint that the past is real and the future unreal.²² As far as I am aware, there is no scholarship on this aspect of Whitehead's work, and further study is needed. Interestingly, scholars have argued that Whitehead drew on Alexander.²³

Unlike the works by Caird or Whitehead, we have seen that Alexander's *Space, Time, and Deity* plainly contains an articulation of the growing block theory. We know that Broad read this book very carefully, in a period shortly before writing *Scientific Thought* (and, in the preface, Broad (1923, pp. 5-6) names Alexander as one of several influences upon him). Alexander's remarks on the growing block theory occur just a few pages after his discussion of the irreversibility of time, so it seems probable that Broad would have read the relevant passages, although he does not comment on them. Consequently, it is very plausible that Broad found his solution to the problem of direction in Alexander, as well as the problem itself.

4.3 Broad's shift away from the growing block theory

As the focus of this paper is on the growing block theory, I will not discuss Broad's final account of time in depth. However, this section briefly argues that Broad's preoccupation with the direction of time did not fade away.

Broad's final account of time is embedded in the 1938 volume of his *Examination of McTaggart's Philosophy*. Over twenty years later, Broad (1959, pp. 765-6) wrote that he still held this account, albeit with 'much hesitation in view of the difficulty of the subject'. However, the details of this account are difficult to discern.

Broad's final account of time retains realism about temporal passage. Broad (1938, p. 308) writes there is a 'steady movement of the quality of presentedness along the series in the direction from earlier to later'. However, the growing block theory has dropped away. Broad

²² For example, Whitehead (1919, p. 62) writes that events never change but nature 'develops', in the sense that an event e^1 becomes part of an event e^2 which includes e^1 and also extends into the futurity beyond e^2 .

²³ See Lowe (1949, pp. 291-4). It is faintly possible that Whitehead drew on Alexander's articulation of the growing block theory, as Whitehead's *Enquiry* came out after the delivery of Alexander's Gifford lectures.

(1959, p. 765) writes that whereas *Scientific Thought* was concerned with the increasing sum total of existence, the *Examination* was ‘free from the worst of that kind of crudity’. If Broad is no longer a growing block theorist, what ontology of time does he hold?

Mundle (1959, pp. 364-74) provides the only extended discussion of this question, and he argues that the answer depends on what Broad means by ‘becoming’. Broad’s *Scientific Thought* (1923, pp. 67-8) held that when an event ‘becomes’, it becomes present and comes into existence. Broad’s *Examination* (1938, p. 280) writes, ‘To “become present” is, in fact, just to “become”, in an absolute sense; i.e., to “come to pass” in the Biblical phraseology, or, most simply, to “happen”’.

Mundle (1959, p. 366) argues that the *Examination*’s characterisation of ‘becoming’ could mean one of two things. On the first reading, ‘becoming’ might still mean coming into existence. In the *Examination*, it is unclear whether past or future events exist. However, in a paper published the year before, “The Philosophical Implications of Foreknowledge” (1937), Broad makes some remarks on this issue. This paper considers an objection that might be made to precognition, that a person cannot stand in relation to a future event ‘until it exists’. Against this objection, Broad (1937, p. 180) observes it would rule out the possibility of memory too, in which a person stands in relation to a past event which ‘no longer exists’. Broad emphasises, ‘The argument is precisely parallel in the two cases’. Broad is arguing that past and future events should be treated symmetrically, and neither exist. If this reading is correct, then we have reason to believe that the *Examination*’s language of ‘becoming’ connotes existence: when events ‘become’ they come into existence, and when they cease to be present they cease to exist. On this reading of becoming, Broad would be a presentist. If this reading is accurate, it would be interesting to know how Broad would reconcile his relationism with presentism.²⁴ However, Broad would not need to reconcile presentism with an extensional model of temporal awareness, as Broad’s *Examination* firmly offers a retentional account of temporal experience.²⁵

On the second reading of ‘becoming’, Mundle (1959, p. 368) suggests that the term does not carry any metaphysical implications, it is merely being used as a synonym for ‘happening’. On this reading, Broad would be an eternalist. Mundle seems to prefer this

²⁴ There is evidence that Broad continued to hold relationism throughout his career. Whilst discussing the historical debate, Broad (1946, p. 157) writes, ‘Let us grant, for the sake of argument, that the Absolute Theory of Space and Time is in some sense an intelligible hypothesis and not just meaningless verbiage’.

²⁵ See Dainton (2016, §2.7).

reading of Broad, and suggests that Broad's language of becoming is 'a sort of hangover' from Broad's growing block theory. Savitt (2002, p. 161) also reads Broad as an eternalist by this point. Admittedly, holding eternalism and realism about temporal passage would be unusual, but there are precedents (such as the moving spotlight theory, which has defenders today).

Settling this ontological question about Broad's third account of time would require deeper investigation. However, I want to show that whether this account is presentist or eternalist, the direction of time remains at the heart of it.

On the face of it, Broad's conviction that the time series has an intrinsic direction has dropped away by his *Examination*: whilst writing on his own views, no mention is made of it.²⁶ And yet, in his late remarks on time, Broad writes:

Absolute becoming manifests itself as the continual *supersession* of what was the latest phase by a new phase, which will in turn be superseded by another new one. This seems to me to be the rock-bottom peculiarity of time, distinguishing *temporal sequence* from all other instances of one-dimensional order, such as that of points on a line, numbers in order of magnitude, and so on (Broad, 1959, p. 766).

Although Broad's language has evolved, the process he describes, on which in a temporal sequence one phase is superseded by a later phase, is incontrovertibly *directional*: earlier phases are always succeeded by later phases, never vice versa. This directional process distinguishes the time series from other ordered series, just as it did in *Scientific Thought*. Whether Broad is a presentist, or an eternalist, the direction of time is still a feature of the world that requires explaining, and it is still explained (however this is precisely understood) by becoming.²⁷

²⁶ At several points, Broad's *Examination* (1938, p. 269; p. 519) writes that temporal relations have direction but allows that this direction can run either way: 'there are two intrinsically opposite directions, earlier-to-later and later-to-earlier'. As should be apparent, Broad's use of the term 'direction' here is very different to that of *Scientific Thought*, where by 'direction' he means a privileged direction, such that the time series can only run one way, earlier-to-later. This is not to say that the *Examination* does *not* privilege this direction; Broad (1938, p. 522) writes that he has 'no doubt' that in some way the earlier-to-later direction is more important.

²⁷ If Broad is an eternalist by his *Examination*, then the emphasis he places on the intrinsic direction of time would distinguish his eternalism from others. Savitt argued that Broad's mature eternalism comes close to that of Donald Williams. However, Williams (1951, p. 468) strongly rejects the view that the time direction itself is 'primitive', arguing instead that its apparent directionality results from differences in the mere 'run and order' of the world's filling. For Williams, the apparent direction of time derives from the contingent directionality of its contents. In contrast, Broad's mature account hangs onto the thesis that time itself is directional, given the intrinsic directionality of supersession.

5. The early reception of Broad's growing block theory

This paper has shown that the growing block theory was first articulated by Alexander, yet first defended by Broad. This raises a question. Given that the first person to describe the theory didn't actually defend it, and the first person who did defend it only did so for a few years, how did the theory survive past the early twentieth century? Somewhat counter-intuitively, I argue the answer lies in the number of negative reactions the growing block theory received in the decade following the publication of *Scientific Thought*.

In Anglo-American philosophy, the theory was attacked from all sides. The anti-realist McTaggart (1927) described Broad's account as 'untenable'. The Russell-style eternalists R. M. Blake (1925) and R. B. Braithwaite (1928) critiqued the theory at length. The presentist R. G. Collingwood (1925-1926) objected that the growing block theory conceives the universe as an infinite 'rubbish-heap' for the 'outworn states of the present'.

The only positive reception during this period lies in the work of a late British idealist, Hilda Oakeley. I argue that, in a 1931-2 article titled "The Status of the Past", Oakeley followed Broad in developing her own growing block theory. I also argue that Oakeley drew on Alexander's work, providing another commonality between Oakeley and Broad.²⁸

Although the majority of philosophers who discussed the growing block theory rejected it, I suggest that the fact these thinkers took it to be rich and important enough to be worth responding to in print ultimately contributed to its survival. As the saying goes, 'All press is good press'. This early attention helped to keep the growing block theory alive in the philosophic consciousness, facilitating its resurrection by Tooley over seventy years later.²⁹

²⁸ See Thomas (2015).

²⁹ I'm grateful for thoughtful comments on earlier drafts of this paper from Graeme A. Forbes, Nathan Oaklander, and two anonymous referees.

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